

of much scientific interest. For example, he had no doubt that the volcano was more active during the period of full than of waning moon; he noted a marked variation in the character of the fumes from the volcano at different times, and he was able to correlate the occurrence of a succession of tidal waves with periods of more than usual activity on the part of the volcano.

Mr. L. C. Bernacchi, well known in connection with the voyage of the *Discovery* in the Antarctic, now brought forward an account of his journey in the little explored Rio Inambari region of Peru, where a new field for the rubber trade is opening up. Dr. W. S. Bruce gave an account of his surveying and accompanying scientific work on the island of Prince Charles Foreland in the Spitsbergen group, an island known for three centuries, but never hitherto surveyed. A committee of the section, with a grant from the association, had assisted Dr. Bruce in his work, and his lecture was an elaboration of the report of the committee. He has produced an almost complete detailed map of the island, which has an area of 271 square miles, and has studied its geology, zoology, botany, and meteorology. It may be added here, with regard to the other committees of the section appointed for scientific research, that Mr. R. T. Günther has practically completed his investigation of the oscillation of the land-level in the Mediterranean region, and that Mr. J. Stanley Gardiner's investigations in the Indian Ocean and Dr. A. Strahan's study of rainfall and run-off in certain English rivers are in active progress.

On Tuesday afternoon the meeting of the section was brought to a close with two papers on a subject of local interest, which pointed to a field for new investigation lying at our doors. Mr. Harold Brodrick gave the results of his explorations and measurements in some of the limestone caves of the county Fermanagh—Marble Arch Cave and others in the vicinity; while Dr. C. A. Hill spoke of the Mitchelstown caves in the county Tipperary, one of which, though frequently visited by tourists, is far from having been explored in its entirety, while the other, though discovered at a much earlier date, is never visited now. These caves, unlike those described by Mr. Brodrick, which are underground water-courses, are the product of a hydrographic régime no longer extant; they are no longer subject to water action, being practically dry, and their high antiquity, thus proved, gives them a peculiar interest.

EDUCATION AT THE BRITISH ASSOCIATION.

A VERY full programme was arranged for each of the four morning meetings, and the attendance of members, although never very large, was remarkably sustained throughout the sessions. In the afternoons visits were paid to schools of varied types, and no pains were spared by the staffs of the institutions in their endeavour to make these visits as instructive as possible. It was evident that the majority of those present at the discussions were engaged in teaching or in educational administration. The "popular" side of Section L has given way to the professional side, which is as it should be.

The thoughtful address given by Prof. Miall sounded the right note of scientific investigation and careful criticism (*vide NATURE*, October 8). Prof. Armstrong followed the president with a paper entitled "The Outlook: a Grand Experiment in Education." The author took an optimistic view, chiefly based on his observation that a more practical treatment of the scholar prevails than was the case a few years ago. Schoolmasters and mistresses were beginning to recognise that English really was a language, but the brightest spots were the schools at Osborne and Dartmouth. With the advantages of naval discipline and *esprit de corps* the sailor had cut the Gordian knot and broken down the old tradition that the school was a place for literary study. Experimental schools should be introduced into the country, but the hand of the builder should be stayed until it was known what was required. He asked for a Royal Commission of Inquiry, consisting of a few competent persons, who should study existing methods of education and make recommendations.

Mr. R. Blair (executive officer of the London County Council) followed with a paper dealing with the progress made in the organisation of education in the area under the authority of the council. Some idea of the magnitude of the task performed may be gleaned from the annual expenditure, which is four and a half millions sterling on elementary and one million on higher education. In the elementary schools the subjects of instruction, in addition to those usually found in public elementary schools, include elementary science, nature-study, domestic economy, manual training, physical exercises, swimming, and in certain cases modern languages. By means of conferences and consultative committees the twenty thousand teachers employed have opportunities of expressing their views on the management of the schools. In addition to training their own teachers to the standard of professional qualification required by regulation, the council provides for further training of practising teachers in connection with London University. The extensive and highly varied work of technical education, from the ordinary evening school to the polytechnic, is being coordinated. With regard to secondary education, the policy of the council is to provide, or assist in providing, secondary education at a moderate fee for those who are able to avail themselves of it, and to offer the advantages of secondary education free of charge to the most promising children from the elementary schools. Omitting private schools, half the pupils are in secondary schools aided by, and nearly one-tenth in those belonging to, the council. Physical education, organised games, and medical inspection are now receiving a large amount of attention, and open-air schools have been included in the experiments made to deal with physical defects. Necessitous children receive meals through voluntary funds. As an instance of the scale on which the authority works, we note the item of 900,000 plants and other nature-study specimens supplied monthly by a small botanical department. We can only mention that Mr. Blair expounded clearly the principles which guided the authority (1) in its provision of accommodation for pupils in elementary schools; (2) in its provision and award of scholarships; (3) in the training and promotion of teachers.

Mrs. E. M. Burgwin then read a paper on special schools for the physically defective and the mentally deficient. The permissive Act known as the Elementary Education (Defective and Epileptic Children) Act, 1899, enables an education authority to take charge of feeble-minded children (not imbeciles) until the age of sixteen. The late London School Board opened its first special school in 1892, and there are now in London eighty-four schools, with a roll of 6006, for the mentally deficient, and twenty-eight schools, with a roll of 2255, for the physically defective. In the case of the mentally deficient, the schools aim at developing intelligence through the motor senses. The aim in teaching the physically defective is to train them to become good workers in spite of their infirmity; for this, expert trade teaching for four years before leaving school is necessary. Only by decreasing tuberculosis can we reduce the number of cripples.

The second morning was devoted to practical instruction in elementary schools and to education in relation to rural life. Sir Philip Magnus prefaced the reports of the committee on elementary experimental science studies in elementary schools with a review of work accomplished since the appointment of the committee at Southport in 1903. He took the opportunity to congratulate the Irish people on the passage of the Irish Universities Act, and on the prospect thereby afforded of securing for all classes of citizens further opportunities of higher education. He sincerely hoped that those who were training to become teachers in elementary schools might reap the advantage of the wider learning and broader views of life which residence at a university offered. Mr. W. M. Heller read the report of the subcommittee, which insisted upon including in the curriculum experimental work to be performed by the pupils. More attention should be paid to aims and methods in teaching elementary science, and inspectors should understand both subject-matter and methods. Particular emphasis was laid on the importance of training girls in the methods of experimental inquiry. With the report are four appendices containing alternative syllabuses and a list of apparatus.

A thoroughly well-sustained discussion on rural education was opened by Prof. Miall, who urged teachers to lead their pupils to see, handle, and think for themselves. It was regrettable that so many artificial aids—pictures, ready-made preparations, &c.—were employed. Referring to school gardens, Mr. David Houston urged that the education of the child must come before the desire to have a prolific garden. Miss Lilian Clarke described her methods used at Dulwich, and Mr. George Fletcher detailed a course of classes in rural economy which has been given to certain teachers by the Irish National Board of Education. Mr. Fletcher said that it was less a question of the introduction of a new subject into the curriculum than the infusion of a new spirit into the system. If every school in town and country possessed and utilised freedom to make its surroundings a means of education, the problem would be in a fair way to solution. He urged the value of carefully arranged summer courses of instruction for teachers, as the new spirit could only come through the teacher. The audience heartily approved Mr. Fletcher's statement. Mr. C. H. Bothamley gave an account of the fairly successful efforts made to promote rural education in certain English counties, referring particularly to Somerset. The Very Rev. Dr. Delaney expressed the opinion that, alike in the training of children and of teachers, the fetish of examinations was the curse of education. Mr. J. Hegarty, a member of the Co. Dublin Teachers' Committee, pointed out that school gardens would not give a desire for rural living while agricultural wages were so low. Miss Constance Cochrane believed that small holdings would go a long way towards promoting the success of agricultural education—where these had been established she had seen the greatest keenness on the part of both parents and children to learn all they could from the school gardens; where there was no prospect of a holding, the boys' wish was to get away from the country. Miss Cochrane added detailed advice, based on successful experience as a school manager in remote rural districts. The Rev. Dr. Kingsmill Moore, principal of the Church of Ireland Training College, deprecated specialisation in the early education of children. Their object must be, not to fill the mind, but to make it capable of filling itself.

Education in Ireland was the leading subject at the Monday meeting. According to the printed programme, the discussion on this subject was to have been preceded by one on tests of educational efficiency. However, on the request of the committee of the section, the opener, Mr. T. P. Gill (Secretary of the Department of Agriculture and Technical Instruction for Ireland), merged the question of efficiency tests in the consideration of the situation in Ireland, and his paper led to an animated debate. In his original abstract he had considered educational tests under three aspects:—(1) Physical: the effect upon bodily development; health; intellectual efficiency and moral strength as depending on health; manual training; discipline. (2) Mental: the development of observing, thinking, and correlating power; the avoidance of cram. (3) Moral: the test here should aim at ascertaining whether the teachers have the right outlook and influence; whether the pupil is being led to know and love the right things; to understand his private and public duties; to select true aims in life. Mr. Gill welcomed the opportunity of discarding more abstract themes, and turned to the Irish situation at the present moment. The country had to organise a new university system, and he looked forward to such a reform as would produce a truly national education, not, as in the past, imposed from without, but developed by Irish thought concentrated effectively upon this aim. He considered that the educational mill had worked recently in a manner calculated to manufacture a half-baked and inefficient nation, the special target of his criticism being the intermediate schools. He looked forward to a day of intellectual freedom for these schools, when inspection would be substituted for examination. The main impulse for these reforms must come from the universities, and they now had to consider and settle upon their purpose and ideal. They had to create, not only a congeries of professional schools, not only a machinery for research, but an intellectual and moral centre for the nation.

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Prof. Benjamin Moore followed with a paper on correlation of primary, secondary, and university education in Ireland. There has been no co-ordination between the chief bodies—the Board of National Education, which controls the national schools; the Intermediate Board, which exerts bureaucratic sway over intermediate or secondary schools; the universities, which have hitherto taken no share in moulding either the primary or the secondary education of the country. The changes necessary may be summarised as follows:—(1) Primary or national education: the training of the teachers should be under the faculty of education in the university. (2) Secondary or intermediate education: each university within its own sphere of influence should recognise secondary schools, and the university, acting in sympathy with the teachers of the schools, should test the work of the pupils; the system of work should be drawn up by each school with the approval of the university.

The Rev. Dr. Evans defended the action of the Board of National Education, and Prof. Culverwell supported the views expressed by Prof. Moore. The Rev. Canon Mahaffy admitted the existence of serious drawbacks in Irish education. Poverty, the drain of emigration (leaving the feebler behind), and the lack of a sense of duty in regard to school attendance, were responsible for defects, and it was not fair to attribute these to the schools. The system was not such a failure as Mr. Gill had made out, and there was no want of high moral teaching in their schools. The Rev. T. Corcoran would rather modify the examination system than put the teacher under the inspector, with consequent loss of freedom. Subsequent speakers referred to the pay of the teachers, and the Rev. Dr. Delaney warmly sympathised with the strong condemnation passed on the miserably insufficient payment of the teacher in the elementary schools. He also referred to the university question, and approved the Liverpool University charter, which includes representative men of Liverpool and neighbouring counties.

Miss C. P. Tremain opened the discussion on the important question of training in teaching. She pointed to three stages in such training:—(1) General education in school and university college. (2) Professional training, including instruction in the theory and practice of education and hygiene. The longer course for intending elementary-school teachers, where the students pursue degree and training courses together, is less successful than the short, intensive post-graduate course for intending secondary-school teachers. The aim is not to produce finished and perfect teachers, but rather aspiring and intelligent ones who will be able to adapt themselves to and learn from subsequent experience. (3) The experience stage of training. Valuable assistance would be rendered if secondary schools directed more attention to the mother-tongue, drawing, clear enunciation, and physical culture. Mr. Charles MacGregor, as the second speaker on this subject, sketched a system of training which would occupy three years for non-university students and four years for those following a university course. In explaining the principles of such a scheme he emphasised the need for child-study, for study of recent history of education, and for accustoming students to the idea of experiment in education.

The programme for the last day was a crowded one, and the discussions on the topics were much curtailed. First came the report of the subcommittee upon the sequence of science studies in secondary schools, which was read by Mr. G. F. Daniell. The first half of the report summarised the replies received to a number of questions addressed to science masters in different types of school. Speaking generally, there is remarkable agreement as to the subjects taught and the order in which they appear in the curriculum. There is also close agreement as to the aim of science teaching, but a great diversity in method. The committee believes this diversity to be healthy, as it desires that the teacher should have a large liberty in the choice of his methods. It deprecates the discouragement of improved methods which is found to result from the existing system of preparing for examinations. Two useful tables in the report indicate the usual science subjects in schools where the leaving ages are sixteen and eighteen respectively, and the average

age at which they are studied. Among the recommendations are the following:—(1) the teaching of elementary physical measurements should form part of the mathematical course; (2) preparatory schools should teach natural history (including some physical geography) and the rudiments of physics; (3) qualitative work deserves respect, and good scientific literature and lectures should not be underrated; (4) the claims of geography and biology should receive more recognition; (5) all science work of boys should be brought into closer touch with everyday experience; (6) more laboratory assistants should be provided. Mr. Eggar commented on the report, and asked for attention to the historical order of discovery in framing courses of instruction.

Next on the programme came an open discussion on note-taking and reports of work, which was initiated by the president. Prof. Miall, and subsequently Mr. Fletcher, advised that pupils be trained to arrange their work under heads and subheads, and that these should be the most important feature of their notes. The use of intelligible contractions was advisable. Prof. R. A. Gregory directed attention to the waste of labour by writing as lecture-notes matter which was easily available in books. The Rev. T. Corcoran urged that the mapping of histories should be performed by the students themselves. He also advocated the introduction of "scientific" note-taking into classical subjects; in other words, the teachers of classics should take a leaf out of the book of their colleagues on the scientific side. Dr. Kimmins had been impressed with the good quality of the note-taking by American boys and girls; they showed the capacity to seize upon the important point in an argument. He objected to the waste of time involved in making fair copies of notes, while admitting that parents gloat over elaborate note-books. Mr. Mayhew Heller expressed doubts as to the wisdom of demanding notes from quite young students.

The discussion on clear speaking and reading aloud was opened by Mrs. Mackinnon, who fell under the suspicion of giving us an object-lesson in this art. Besides attending to final consonants and making the children read at a distance from the audience, she made the child give an epitome of the passage before attempting to read aloud. This secures that what is to be read has been understood, which is absolutely necessary for good reading. Miss Cooper wished more attention to be given to phrasing, including stress and pause. Prof. Miall pleaded for a revival of reading aloud in the family. The Rev. Dr. Delaney having stated that boys come to the university unable to speak properly, despite the years spent in secondary schools, Mr. G. F. Daniell suggested that boys ought to be taught to speak well after, as well as before, the break of voice. Dr. Ernest Gray raised the question of the influence of phonographic writing on speaking. He also spoke of the way in which speakers turn their heads without turning their bodies, and pointed out that no successful orator falls into this error.

Dr. G. Archdale Reid gave a paper on acquirement in education. He stated that everything we learn is acquired. The new-born baby is not intelligent; he has only great capacity to learn to become intelligent. When we send a child to school we design that he shall not merely learn knowledge more abstruse than that which he can pick up, like a savage, from the ordinary experiences of life, but also acquire right habits of thought or mental dexterities. The best educational subjects at the same time supply useful knowledge and exercise the thinking faculty. Knowledge to be useful must be remembered; to be remembered it must link up with our subsequent experiences. Prof. Culverwell disagreed with many of Dr. Reid's views, and put forward theories relating to mental change and the transference of energy within the brain. Profs. H. Browne and R. M. Henry upheld the teaching of classics, and Principal Griffiths objected to the fight between the protagonists of science and classics as a mischievous and unnecessary quarrel.

Prof. J. A. Green read an important paper on experimental studies in education. The author gave a sketch of work which is being prosecuted abroad which will greatly help to lay a wise foundation for future teaching practice. The teacher, as such, is not primarily a re-

searcher, but he wants the results of research in a usable form, and university departments of education should be organised so as to provide them. Laboratories have already been instituted in Antwerp, St. Petersburg, Leipzig, Milan, and Budapest for experimental inquiry into the problems which confront the teacher. Miss Foxley gave an account of the work which is being done in Manchester under Prof. Findlay's direction. The audience was impressed with the importance of the subject, and heard with pleasure that a research committee of Section L has been appointed, with Prof. Findlay as chairman and Prof. Green as secretary, to inquire into the methods and results of research into the mental and physical factors involved in education.

By kind permission of the authorities, visits were paid to Maynooth, Loreto Abbey Convent School at Rathfarnham, Wesley College, Christian Brothers' Schools, Alexandra College, Mountjoy School, and Artane Industrial School.

The section was indebted to the Rev. T. Corcoran for a useful exhibit of maps to aid in the teaching of Greek and Irish histories.

The interim report on the conditions of health in schools, prepared for Section L, was presented in the Physiology Section. It was, unfortunately, impossible to arrange a joint meeting of the two sections. Reference was made to the relation between the educational and other sections of the association by Sir Philip Magnus at the opening meeting. He pointed out that Section L was able to help the other sections by discussing the methods of teaching the various branches of science with which they were concerned, and he hoped that the older sections would refer to the education section the consideration of problems relating to methods of instruction.

Twenty-two educational associations were officially represented at the meeting, and it is desirable that means should be devised to render the interest thus displayed of more effect in promoting the work of the section and in spreading the influence of that work.

G. F. DANIELL.

FORTHCOMING BOOKS OF SCIENCE.

AGRICULTURE.

George Bell and Sons.—The Farm and the Dairy, Prof. J. P. Sheldon, new edition, illustrated. *The Cambridge University Press.*—Tropical Agriculture, J. C. Willis. *Cassell and Co., Ltd.*—Live Stock; Dairy; Equipment, each by P. McConnell, illustrated. *Williams and Norgate.*—Principles and Practice of Agricultural Analysis: a Manual for the Study of Soils and Fertilisers and Agricultural Products, H. W. A. M. Wiley, vol. ii., Fertilisers.

ANTHROPOLOGY.

A. and C. Black.—Ancient Tales and Folk-lore of Japan, R. G. Smith, illustrated. *J. M. Dent and Co.*—Folk-lore in Lowland Scotland, E. Simpson. *Macmillan and Co., Ltd.*—The Golden Bough: a Study in Magic and Religion, Prof. J. G. Frazer, third edition, Part i., The Magic Art and the Evolution of Kings; Totemism and Exogamy, Prof. J. G. Frazer, 2 vols. *Milner and Co., Ltd.*—Prehistoric Man, J. McCabe; Races of Man, Dr. A. C. Haddon, F.R.S. *John Murray.*—The South African Natives: their Present Condition and Progress, edited by the South African Native Races Committee. *Kegan Paul and Co., Ltd.*—The Scope and Content of the Science of Anthropology, J. Dieserud.

BIOLOGY.

Appleton and Co.—The Cat: its Care and Management, Mrs. Leslie Williams, illustrated; The Life and Habits of Ants, Dr. L. L. Dublin, illustrated; Man in the Light of Evolution, J. M. Tyler; The Sexual Instinct, J. F. Scott, second edition. *Edward Arnold.*—Scottish Gardens, Sir H. Maxwell, illustrated. *George Bell and Sons.*—Biology and its Makers, Dr. W. A. Locy, illustrated. *A. and C. Black.*—The Science and Philosophy of the Organism, Dr. H.